horizontal and vertical bands, said dynamic range module determining a dynamic range of said clinical region within said at least two bands.

REMARKS

Claims 1-24 were originally presented in the present application, of which claims 1, 3, 6, 8, 9, 11, 12, and 15-24 have been amended. New claims 25-27 have been added. Claims 2, 13 and 14 have been cancelled without prejudice or disclaimer of the subject matter therein. It is respectfully submitted that the pending claims define allowable subject matter.

Claims 1-24 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Ergun et al. (USP 6,298,109) Applicant respectfully traverses the outstanding rejection for reasons set forth hereafter.

Turning first to the Drawings, Applicant submits FIG. 2, FIG. 4 and FIG. 7 with a sketch in red ink of the changes to be incorporated. FIG. 2 and FIG. 7 have been changed to delete the downward arrow from final steps 66 and 212, respectively. FIG. 4 has been changed to include reference numbers for left side 77 and right side 79. Left side 77 and right side 79 are described in Applicant's specification on page 10, lines 22-25. It is submitted that the changes to the Drawings do not constitute new matter. Thus, Applicant respectfully requests that the changes to the Drawings be allowed.

Claim 1 concerns a method for determining a dynamic range of a digital medical image which contains a clinical region. The method includes dividing the digital medical image into at least two bands of predetermined width. Determining, within each of the bands, whether the digital medical image includes at least one non-clinical region, and calculating a dynamic range based on a clinical region within each of the bands. Ergun does not teach or suggest, among other things, the claimed dividing or calculating steps. In contrast, Ergun teaches mapping the radiation data from the CCD camera to the image pixel brightness, which will follow a nonlinear compression curve. "This curve is selected from a number of possibilities so that equally wide bands of image pixel brightness 104 and 106 have equal amounts of image noise." (col. 10, lines 55-57) As illustrated in FIG. 12 of Ergun, the bands of image pixel brightness 104 and 106 are two narrow bands that do

not include the entire digital medical image. Furthermore, the clinical regions within bands 104 and 106 are not utilized to calculate a dynamic range. Instead, as stated above, the bands are used to equalize the image based on image noise and to select the curve 103 based on the amount of image noise within each band. The curve 103 may additionally be positioned to provide maximum contrast, which may not be desirable. Thus, it is respectfully submitted that claim 1 is not anticipated or rendered obvious by Ergun.

Claim 11 concerns a medical diagnostic imaging system for controlling a dynamic range of a digital medical image to be displayed. The system includes a segmentation module identifying clinical and non-clinical regions within a digital medical image, where the non-clinical regions comprise at least a collimated region. The system also includes a dynamic range module for determining a dynamic range of a clinical region of the digital medical image based on the clinical region. Ergun does not teach or suggest, *inter alia*, the claimed segmentation module, nor non-clinical regions comprising at least a collimated region. Ergun instead teaches identifying only raw radiation (background pixels) as illustrated by histogram 122 of FIG. 13. "In identifying this peak 124, the computer 22 examines the histogram 122 from the brightest pixels (rightmost) to the darkest pixels (leftmost) assuming that the brightest pixels are more likely to be the unattenuated background pixels." (col. 11, lines 46-50) Therefore, Ergun's system only detects non-clinical data representing unattenuated pixels which exceed the identified peak (upper threshold) and does not examine the histogram 122 to identify a lower peak (lower threshold). A non-clinical region representative of a collimator is not detected by Ergun, and thus pixels representative of collimator data would be included when calculating the dynamic range of a clinical region. Hence, it is respectfully submitted that claim 11 is not anticipated or rendered obvious by Ergun.

It is submitted that Ergun neither anticipates nor renders obvious the dependent claims as well. Claim 3 concerns dividing the digital medical image into one of horizontal and vertical bands. Claim 26 includes a processor dividing the digital medical image into at least two bands and determining a dynamic range of the clinical region within the bands. Claim 27 includes a processor dividing the digital medical image into at least two bands comprising one of horizontal and vertical bands, and determining a dynamic range of the clinical region within the bands. It is respectfully

submitted that Ergun does not teach or suggest dividing the digital medical image into bands, either horizontal or vertical, as discussed previously. Rather, Ergun collects the values of all pixels in the image and creates a histogram. All the pixels are plotted at one time according to their value on the horizontal axis, while the number of pixels having a particular value is plotted on the vertical axis. (col. 11, lines 25-32) The pixels are binned according to their values, rather than in a predetermined width, and used to calculate an exposure rate. (col. 11, lines 62-64)

Claim 8 concerns masking at least one non-clinical region based on at least one gray scale maximum and minimum value for the non-clinical region, wherein the non-clinical region comprises either a raw radiation region or a collimated region. Claim 9 concerns generating a histogram of the digital medical image and masking gray scale levels from the histogram that exceed predetermined upper and lower thresholds. As stated above in connection with claim 11, Ergun identifies a single non-clinical region within a digital medical image, namely a non-clinical region comprising unattenuated background pixels, or raw radiation. A non-clinical region comprising a collimated region would not be detected and masked.

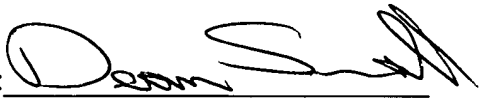
It is respectfully submitted that the pending claims define allowable subject matter. Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the telephone number listed below.

Please charge any additional fees or credit overpayment to the Deposit Account of McAndrews, Held & Malloy, Ltd., Account No. 13-0017.

Respectfully submitted,

McANDREWS, HELD & MALLOY, LTD.

Date: April 9, 2002

By: 

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APPENDIX

AMENDMENTS TO THE CLAIMS

1. (Amended) A method for determining a dynamic range of a digital medical image for a medical imaging system, the digital medical image containing a clinical region, comprising:

dividing a digital medical image into at least two bands of predetermined width;

determining whether the digital medical image within said at least two bands includes [a] at least one non-clinical region; and

calculating a dynamic range based on [for] a clinical region within each of said at least two bands.

3. (Amended) The method of claim 1, wherein the dividing step further comprises dividing the digital medical image [is divided] into one of horizontal and vertical bands [during the determining step].

6. (Amended) The method of claim 1, wherein said determining [identifying] step discriminates at least one of histogram maximum and minimum values for a non-clinical region based on at least one predetermined threshold.

8. (Amended) The method of claim 1, further comprising masking said at least one non-clinical region[s] based on at least one of gray scale maximum and minimum values for the at least one non-clinical region, said at least one non-clinical region comprising one of a raw radiation region and a collimated region.

9. (Amended) The method of claim 1 [7], further comprising:

generating a histogram of the digital medical image; and [, said masking step]

masking gray scale levels from the histogram that exceed predetermined upper and lower thresholds.

11. (Amended) A medical diagnostic imaging system for controlling a dynamic range of a digital medical image to be displayed, [the digital medical image including a clinical region and a non-clinical region,] comprising:

a segmentation module identifying [a] clinical and non-clinical regions within [of] a digital medical image, said non-clinical regions comprising at least a collimated region; and

a dynamic range module determining a dynamic range of a clinical region of the digital medical image [once] based on the [non-]clinical region [is segmented].

12. (Amended) The system of claim 11, further comprising[:] a digital detector obtaining [a] said digital medical image having said clinical and non-clinical regions.

15. (Amended) The system of claim 11, wherein the segmentation module identifies said non-clinical regions based on variations in gray scale levels of the digital medical image.

16. (Amended) The system of claim 11, wherein the segmentation module differentiates at least a portion of the digital medical image to identify the non-clinical regions.

17. (Amended) The system of claim 11, wherein the segmentation module discriminates the non-clinical regions based on at least one gray scale threshold value.

18. (Amended) The system of claim 11, further comprising a processor calculating at least one threshold based on a dynamic range of the digital medical image, said segmentation module discriminating the non-clinical regions based on said threshold.

19. (Amended) The system of claim 11, [wherein] said dynamic range module including a processor masking over [a] said non-clinical regions when determining the dynamic range of the clinical region.

20. (Amended) The system of claim 11, further comprising[:] a processor calculating at least one of a maximum and minimum gray scale level for the digital medical image in order to identify the non-clinical regions.

21. (Amended) The system of claim 11, further comprising[:] a processor calculating at least one of maximum and minimum gray scale levels for the clinical region in order to determine the dynamic range of the clinical region.

22. (Amended) The system of claim 11, further comprising[:] a processor generating a histogram of at least a portion of the digital medical image to identify gray scale levels associated with said non-clinical regions.

23. (Amended) The system of claim 11, wherein the segmentation module masks [a] said non-clinical regions identified in the digital medical image.

24. (Amended) The system of claim 11, wherein the segmentation module determines that the digital medical image does not include [a] said non-clinical regions, said dynamic range module using the digital medical image to determine[ing a] said dynamic range of the digital medical image [as the clinical region].